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Barrier-Free Campus: University Malaya, Kuala Lumpur

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Abstract

Currently, the provisions of the barrier free facilities are not well distributed and insufficient in the campus area. The university authorities neglected and not well maintained the existing facilities. This research highlighted the importance of the barrier free design and facilities from the PwDs perspective. Mean score analysis is used to measured the condition of facilities from PwDs point of view. Some of the selected area had low mean score and in need of improvement. Hence, the recommendations were suggested to improve the condition of barrier-free facilities.

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Keywords: Barrier free design and facilities; person with disabilities (PwDs); university and campus area

1. Introduction

Nowadays, (PwDs) yearn for involvement in community activities and to socialize globally either through education, profession or entertainment. A barrier free design facility is a medium that help people with disabilities to communicate and survive in the educational environment. Imrie (1996) states that there exists "…the development of disablists, actively discriminating against the physical mobility and access needs of a significant proportion of disabled people (p. 18)." In recent years there have been many criticisms from the public and handicapped in Malaysia expressing their dissatisfaction on the services

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provided by the government (Kamarulzaman), 2007. According to Persons with Disabilities Act 2008, Section 28, it states that PwDs have a right to access to education. (Hazreena), 2006 in her research entitled "Encouraging A 'Barrier-free Built Environment' In A Malaysian University" stated that the number of the barrier-free design facilities provided has been decreasing in the campus area. In addition to that, (Kamarulzaman), 2007 agreed that disabled people have right to involve in the community, and the provision of barrier free facilities will help PwDs to move actively and interact better with others. This study was undertaken to identify the user level of satisfaction with the current condition of the barrier free facilities provided in the campus area of University Malaya.

1.1. Aimed and objectives

The aimed of this research is to implement barrier-free design facilities effectively in University Malaya campus area in order to meet the requirement of the barrier-free campus in improving accessibility and mobility of the disabled users. In order to answer the research questions above, and achieve the aim of the study, the following objectives have been developed:

i. To identify current provision of the barrier-free design facilities in Universiti Malaya (UM) campus area.
ii. To assess the barrier-free design facilities provided in UM campus area.
iii. To identify the issue and problem faced by the disabled users in the campus environment.
iv. To recommend measures to be taken in order to improve the needs of the target group.

2. Disabled people and category of impairment

According to the statistics from Department of Social Welfare (2006), the registered number of disabled people in Malaysia stood at 197,519 and increased to 233,939 people (Department of Social Welfare, 2009). Under The Persons with Disability Act 2007, people with disabilities are defined as those who "lack the long-term physical, mental, intellectual or sensory abilities, when met with obstacles, preventing their full interaction with society." Universal Design defines disability as:

"The term disability summarizes a great number of functional limitations occurring in any population in any country of the world. People may be disabled by physical, intellectual or sensory impairment, medical conditions or mental illness. Such impairment, conditions or illnesses may be permanent or transitory in nature (p. 114)."

Auxter, Pyfer, and Huettig (2001), stated that physical disabilities can be divided into three categories which are neurological impairment, orthopedic (musculoskeletal) disabilities, and traumatic injuries. In Malaysia, PwDs are known as 'Orang Kelainan Upaya' (OKU).

There are six categories of disability which are registered under Malaysia Department of Social Welfare; a) Hearing disability, b) Vision disability, c) Physical disability, d) Cerebral palsy , e) Learning disability and f) Others

2.1. Legislation and regulations

2.1.1. Persons with disabilities Act 2008 (Act 685)

This act is an act to provide for the registration, protection, rehabilitation, development and well-being of PwDs. Constitutionally, a disabled person may claim his/her rights under Article 8of the Federal Constitution that guarantees equality to all persons unless conditions expressly authorized by the

constitution. The act also covers any discrimination against a person simply on the grounds of disability in the areas of employment, education, housing, transportation, business undertakings, sports, recreational activities, access to public places, access to public facilities and services.

2.2. Malaysian standards

Approval of a standard as a Malaysian Standards is governed by the Standards of Malaysia Act 1996 (Act 549). Malaysian Standards are reviewed periodically. For this research, two types of the Malaysian Standards are being referred which are:

- MS 1184: 2002 Code of Practice on Access for Disabled Persons to Public Buildings (First Revision) - These requirements are applicable to all buildings that disabled persons may use as members of the general another standard. Building types to which the recommendations of the code may be applied include offices, banks, hotels, medical centres, restaurants, religious buildings, schools and so on. The elements covered such as vehicle parking and access, step ramps, doors and doorways, escalators and others.
- MS 1331: 2003 Code of Practice for Access of Disabled Persons Outside Buildings (First Revision) - As for this code of practice, the elements covered are such as footpaths, lighting, ramps, lifts, stairs, handrails, guiding blocks, pedestrian crossings, parking and so on.

2.3. Types of facilities for disabled

Different types of impairment require different kinds of facilities and needs, which sometimes can be conflicting. Sorenson (1979) mentions that movement impairment are the most prevalent where movement are mostly permitted by the use of mechanical aid and to an extreme degree is capable of creating a total barrier to building access. On the other hand, according to Roulstone (1998), he states disabilities on blindness and deafness are different compare to the physical impairment whereby both are of sensory deficiencies and can be allowed by providing additional or alternate information system or sources.

Although the facilities are provided, sometimes the facilities cannot serve proper functions and lead to difficulties to Persons with Disabilities (PwDs). The following are the barriers to PwDs:

Table 1. Types of physical barriers to PwDs

Physical barriers for wheelchair user	Physical barriers for deaf and hard of hearing person
Staircases (no handrails and high risers)	Hard to get disaster warning/ alerting system
Lift (high button panels, not maintained lifts and small lift)	Hard to communicate when travelling especially in airports and highways
Toilets (narrow entrance, no grabs bars, no space to maneuver, high mirror)	Constraints in lift service (flashing lights, emergency buttons)
Accessible parking (far from entrance, insufficient space for unloading wheelchair, no disable parking permits)	Difficulties in building entrance, information counters
Public transportation (lack regular bus service to cater wheelchair users)	
Indoor problems (high switches, high service counter, no lift for buildings higher than 4 storey)	
Outdoor (no curb cuts on walkway, poor signage)	

2.4. Facilities and accessibility in university environment

According to Hazreena (2006), a good pedestrian network around the campus should be accessible and friendly for all users including disabled persons. The environment should offer some activity nodes to ensure that the learning and working in campus is more pleasant. The collaborative development among various professionals and organizations is importance in order to achieve a barrier-free built environment should be emphasized. It will share experience on the education of inclusive design for students who will become professionals and responsible in implementing the legislation relating to safety, accessibility and usability of the built environment.

Previous planning policies and implementations did not set out to provide for a barrier-free built environment and increased difficulty for PwDs to use the campus facilities in Malaysia. (Muhamad & Kamarulzaman, 1988). For example, there were no provisions for slopes for ramp with equal or less than 1:12 for the wheelchair users, lifts were provided incomplete without Braille buttons and audio signals for the vision impaired persons. In addition to that, Natasha, Husrul Nizam and Abdul Hadi, 2012 agreed that building facilities and design influenced students' learning efficiency in the high education institution.

However, inclusion in planning for disabled and collaborators is vital in order to encourage and create a barrier-free built environment. Lack of awareness regarding the facilities for disabled is the main argument for pushing off disability awareness training to be one important activity where it would be integrated as the culture for a caring campus society. The practice had revealed that regulation alone is not enough to achieve the desired needs of disabled persons unless all parties are involved with the awareness programme. When more disabled persons and their concerns are respectfully acknowledged, this will move towards an all-encompassing agenda, which would be integral to the mainstream development of planning the campus.

2.5. Causes of lacking provision of facilities for disabled

Bullock and Mahon (1997), define intrinsic and extrinsic barriers, where the intrinsic barriers derive from the limitation that people with disabilities have, and the extrinsic are those that are imposed on them by the society (which refers to the negative attitude toward them). According to Kennedy, Smith and Austin (1991), there are several reasons for the absence of services for people with disabilities which involve insufficient budget, inadequate facilities, lack of skill and knowledge necessary to establish a program, the feeling that other community agencies already planned programs, and lack of awareness of the need of programs for people with disabilities.

Other than that, there is societal barrier which caused by the negative attitude from the community. Datillo (1994) refers this obstacle as attitudinal barrier, argues that it will be the most difficult barrier to overcome. This barrier is caused from the fear of people towards the disabled, their lack of knowledge and communication skills. Syazwani, Mariam and Asiah 2013, believed that community positive support and encouragement towards PwDs help to improve their self esteem and confident in their social and economic skills.

3. Methodology

Initial stage of the research is to review and understand the subject of the research which is the barrier free design facilities and people with disabilities. Then it is followed by formulation of the study aim and objectives. Then the next stage of study focused on the literature review. This stage also includes the legislation and challenges in providing facilities for the disabled people.

The next stage of the study is data collection and data analysis. Data was collected through questionnaire survey which held through phone calls, emails and distributed during two weeks field survey. The questionnaire has three parts. Part A of the questionnaire deals with the background of the respondents. Part B is concerning with respondents' knowledge regarding to the barrier-free facilities. Finally, Part C emphasizes on awareness on availability, condition and location of barrier-free facilities. This part is involved with rating and ranking questions, as well as opens ended questions which are to capture the respondents' opinion.

The samples are disabled people among students and staffs. Therefore, the population of the disabled community in University Malaya is selected as the target group. The questionnaires have been distributed during the data collection. The total registered disabled students in University Malaya are about 49 persons. However, the selected sample is only 28 persons which covered 57.14% from the total disabled population in University Malaya. The sample size calculation is as below:

$$N = 49,\ n = 28,$$

$$\text{So, } \frac{28}{49} \times 100 = 57.14\%$$

Data analysis will be conducted using Microsoft Excel and SPSS software. The statistical analysis performed includes frequency distributions, bar graph and pie chart which would be used for data presentation. The SPSS is required when population is big, and the samples are huge so that the result shown will be technically precise. Furthermore, the mean difference analysis will be performed to observe the result of condition of the facilities. Whenever necessary, the excel spreadsheet is also can be applied during the analysis. The frequencies will be calculated according to their group of scoring by using this formula;

$$\text{Score (x)} = f \times \text{score (1, 2, 3, 4, or 5)}$$

Then the index of respondents' perception of each criterion can be identified by finding the average index through mean's formula;

$$\overline{X} = \frac{\Sigma X}{N}$$

$$\text{mean} = [(f \times \text{score 1}) + (f \times \text{score 2}) + (f \times \text{score 3}) + (f \times \text{score4}) + (f \times \text{score 5})]$$

Satisfaction on the respective sectors and the description of scoring index result is translated as follow:

Index	1.0	2.0	3.0	4.0	5.0
Description	Very Poor	Poor	Average	Good	Excellent

Another method is by observation. The equipment uses for the observation are camera and measuring tape. The photos captured are the existing conditions of barrier-free facilities at University Malaya. The conditions are categorized into six types which are 'very poor, poor, average, good, excellent and not applicable.' Note taking and checklists are necessary to measure all the primary data.

4. Discussion

Table 2. Summary of respondents' background

Respondents' background	Finding (highest and lowest)	Frequency (%)
Age	21 – 30	21 (75.0)
	>51	1 (3.6)
Gender	Male	21 (75.0)
	Female	7 (25.0)
Classification	Student	28 (100)
Specialization of faculty	Malay Studies, Islamic Studies & Art and Social Science	6 (21.4)
	Science	1 (3.6)
Level of study	Undergraduate	18 (64.3)
	Postgraduate	10 (35.7)
Types of disability	Vision	23 (82.0)
	Physical	5 (18.0)

(Source: Questionnaire survey, 2013)

Based on data from the questionnaire survey conducted, 75% of the respondents' age ranges from 21-30 years old and only 3.6% respondent are aged above 51years old. 75% of the sample taken was represented by the male respondents, and only 25% of the sample is represented by the female respondents. Referring to the respondent in the study area, the classification of the respondents divided into three which are student, staff and other. However, only the students were responded to the survey because there is no registered information about disabled users among staff in UM. Table 2 showed 64.3% of the respondents were undergraduate students and most of them are in their third year. 82% of the respondents were students with vision disabilities and 12% of the respondents were students with physical impairment. According to the department of Section of Counselling, Carrer and Disability of University Malaya and Persatuan Mahasiswa istimewa (PREMIUM), it stated that most of the disabled students in University Malaya have vision impairments and there are no respondent from student with hearing impairment. As for the physical disabilities, the respondents are using wheelchair and a few of them without wheelchair.

4.1. Knowledge about the barrier-free facilities

Part B in the questionnaire is discussed about the knowledge and understanding of the respondents which related to barrier-free design facilities or facilities for disabled people in UM. 92.9% of the respondents answered that they aware about barrier-free design facilities while only 7.1% stated that they did not aware about the facilities for the disabled. During the survey, the respondents that aware of barrier free design have good knowledge about the facilities. Hence, they agreed that it is important to study and understand the usage and need of the facilities as it is considered as universal demand nowadays. The respondents (21 respondents) indicated that their main source of information regarding barrier free design is from related association or Non-Government Organization (NGO). It is followed by the source from family, relatives and friends (12 respondents), which experienced in assisting and guiding

disabled people. There is a small number of respondent (4 respondents) stated that they obtained their information from other sources such as through involvement in the program and also access audit seminar done by the authority.

4.2. Condition of the barrier-free facilities

For the condition of the facilities, the test was done by comparing the mean differences between types of the facilities at different selected areas. Based on the mean calculated, it showed the average perception chosen by the respondents. The mean for highest and lowest for facilities at the six different areas is been highlighted in the table 3.

Table 3. Condition of facilities

Area	Facilities	Mean score (highest and lowest)
Administration building	Staircase	3.36
	Automatic door	3.36
	Parking	2.07
Residential	Ramp	3.18
	Automatic door	1.68
Library	Staircase	3.86
	Lift	3.86
	Signage	2.39
Lecture room/hall	Staircase	2.68
	Automatic door	0.21
Cafeteria	Staircase	2.04
	Lift	0.57
Sport centre	Ramp	1.57
	Handrail	1.57
	Automatic door	0.68

(Source: Questionnaire survey, 2013)

In summary, the result above was analyzed in order to get the overall mean for nine types of barrier-free facilities at six different areas in Universiti Malaya. The highest mean considered as the most satisfaction in terms of condition, rated by respondents for at the selected study areas. Table 4 showed the highest and lowest overall mean score for the six selected areas.

Table 4. The overall mean of condition in each selected areas

	Selected area	Overall mean
1	Administration building / Chancellery	2.85
2	Residential (College of Za'ba)	2.60
3	Library	3.37
4	Lecture room/hall	1.74
5	Cafeteria	1.00
6	Sport centre	1.23

(Source: Questionnaire survey, 2013)

Table 4 above showed that the library has the highest mean (3.37) compared to other six areas at University Malaya. The findings indicated that the mean score of condition for facilities at the library was stand between average (score 3) and good (score 4). On the other hand, the facility that has the lowest mean score regarding to the condition of barrier-free facilities was the cafeteria. The cafeteria mean is only 1.00 which indicates that the overall condition of the facilities at the cafeteria is in very poor condition. It means that the facilities at the cafeteria in UM need to be improved in order to increase the accessibility and mobility of the disabled users in University Malaya.

5. Issues and problems

From the findings, it can be highlighted that the provision of the barrier-free design facilities are not widely implemented in University Malaya. In terms of accessibility and mobility, only certain areas of the university have good accessibility while other areas are still in need of improvement. Even though there is provision of continuous pathway for visually impaired people, the pathway design is not complied the standard guideline. For example, the pathway is built on the uneven road surface. Hence, disabled people cannot distinguish between the uneven road surface and the designated Braille track.

However, the major issue in University Malaya is inefficient and ineffective provision of the signage. During the data collection, most of the respondents complained about the signage because majority of the respondents from visually impaired group. Therefore, they prefer a good signage design and system to be provided in order to assist them in the campus area. Table 5 showed others issues and problems faced by PwDs in University Malaya:

Table 5. Others issues and problems faced by PwDs in University Malaya

Ramps around University Malaya. The slope of the ramps is too high for the wheelchair users and may cause harm to them.	 *Figure 1: The slope for this ramp is too high* *Source: Field survey, 2013*
Poor maintenance of the existing facilities. This situation occurs due to the lack of awareness and responsibilities towards barrier free design facilities.	 *Figure 2: Obstruction along the pathway* *Source: Field survey, 2013*
Road crossing around university Malaya. The PwDs will face troubled to cross from the opposite side of the road due to no specific lane or path provided for PwDs to cross to the another side of the road. In addition to that, campus authorities should provide continuous Braile Track to ease the PwDs movements.	 *Figure 3: Roads in UM which can causeo difficulties to PwDs* *Source: Field survey, 2013*

(Source: Questionnaire survey, 2013)

6. Recommendations and conclusion

The condition of the existing barrier-free facilities in University Malaya is measure based on the mean score analysis. It can be seen that the highest mean score for the condition is the library area, followed by administration building, residential, lecture room, sport centre and lastly cafeteria. Therefore, certain measures need to be taken into consideration which will focus more at cafeteria, sport centre and lecture

room because this area has low mean score analysis. There recommendations suggested is divided to two approaches which are short-term action and long-term action.

6.1. Short-term action

For short-term planning, the facilities of the selected areas that in need of improvement and new proposal will be done phase by phase. The development will focus more at the critical areas such as cafeteria, sport centre and lecture room. The improvement of the facilities by phase can be summarized into the following table.

Table 6. Short-term action plan phase

	First Phase	**Second Phase**	**Third Phase**
Cafeteria			
	Parking	Toilet	Multi-purpose walkways
	Ramp	Staircase	Lift
	Handrail		Automatic door
	Signage		
Sport Centre			
	Ramp	Toilet	Multi-purpose walkways
	Handrail	Parking	Automatic door
		Staircase	

6.2. Long-term action

Universiti Malaya (UM) is already organized program such as Disability Equality Training (DET) for disability liaison. However, the program should be held more often to improve skills for respective liaison in order to provide best service to the disabled community in UM. Other than that, the awareness campaign regarding to the PwDs should be cultivated among the community especially to able-bodied people. The awareness and understanding of the basic needs of disabled persons must be propagated, and one of the best methods to propagate awareness is through educating both the staff and students of University Malaya. In addition, having a disability compliance unit at the Student Affairs also helped the disabled persons to organize events that could promote non-handicapping environment.

As a conclusion, in order to create a barrier-free campus, the provision of the facilities should be comprehensive in relation to the types of facilities. Different impairment will need different types of facilities. Therefore, the awareness and sensitivity towards the provision of barrier-free facilities in the campus area should be fair and square so that all disabled students can enjoy their campus life as a student without having difficulties. It is hoped that with careful planning and sensitive suitable approaches, the campus will be more accessible, friendly and safe for all users in order to achieve barrier-free campus environment.

References

Auxter, A., Pyfer, M., & Huettig, S. (2001). *Principles and methods of adapted physical education and recreation*. *New* York: McGraw-Hill Companies.

Bullock, G., & Mohan, S. (1997). *Leisure education, community development and populations with special needs*. New York, United States of America: Ataran Silvan Publisher.

Datillo, K. (1994). *Information services for people with development disabilities.* New York, USA: Greenwood Library.

Hazreena, H. (2006). *Encouraging a 'barrier-free built environment' in a Malaysian university*. Kuala Lumpur.

Imrie, R., (1996). *Disability and the city: International perspectives*. United States: McGraw-Hill.

Kamarulzaman, K. (2007). Adult learning for people with disabilities in Malaysia: Provisions and services. *The Journal of Human Resource and Adult Learning, 3* (2).

Kennedy, A., Smith, M., & Austin, F. (1991). Department of interior, United States of America.

Legal Research Board. (2008). *Persons with disabilities act, 2008*. Petaling Jaya, Selangor: International Law Book Services.

Malaysia Standard. (2002), MS 1184: *Code of practice for access of disabled persons to public building*. Kuala Lumpur.

Malaysia Standard. (2003), MS 1331: *Code of practice for access of disabled persons to outside building*. Kuala Lumpur.

Muhamad, A., & Kamarulzaman, K. (1998). Penglibatan ibu bapa dalam pendidikan khas. *Jurnal Akademik Maktab Perguruan Kota Bharu, 3*,16 – 21.

Natasha, K., Husrul Nizam , H., & Abdul Hadi, N. (2012). Evaluation and concept of building performance towards sustainability in malaysia higher institution. *Asian Journal of Environment-Behaviour Studies*, *3*(8). Retrieved from http://fspu.uitm.edu.my/cebs/images/stories/cebs/ajebsv3n8c3.pdf

Sorenson, R. J. (1979). *Design for accessibility*. United States: McGraw-Hill.

Syazwani, A. K., Mariam , J., & Asiah, A. R. (2013). Building managers' views on accessibility and ud implementation in public buildings: Putrajaya. *Journal of Asian Behavioural Studies*, *3*(8).